

On February 26 light snow fell in San Francisco, and the hills and mountains in the vicinity were covered.

Conditions during February, 1911, were entirely different from those of February, 1910, with regard to snowfall.

At the close of the month there was an abundant supply of water in sight. The accumulated depth of snow on the ground at Summit was 215 inches, while at the same date last year there were but 72 inches, and the year before that about 160 inches. The mean depth of snow on the ground at this level, based upon records covering many years, is 80 inches. It will therefore be seen that there is nearly three times as much snow on the ground as in a normal season.

SUNSHINE.

The following table gives the hours of sunshine and percentages of possible:

Stations.	Hours.	Per cent of possible.	Stations.	Hours.	Per cent of possible.
Eureka.....	158	53	San Luis Obispo.....	164	53
Red Bluff.....	188	63	Los Angeles.....	307	67
Sacramento.....	197	66	San Diego.....	193	63
San Francisco.....	179	59	Mount Tamalpais.....	156	51
San Jose.....	183	57	Alturas.....		60
Fresno.....	223	74	Santa Cruz.....		72

EARTHQUAKES.

Earthquakes were recorded on the Wicthert seismographs at Santa Clara College, and reported by the Rev. Jerome S. Ricard, S. J., as follows: February 7, 5:19:08 a. m. to 5:21:42; origin, 103 kilometers northwest by west. February 18, 11:30:18 a. m. to 11:55; origin, far away on ocean bottom. Many small tremors during the Macedonia quake, February 19. Los Gatos, February 7, 5:19 a. m., Mr. Irving H. Snyder reports a light shock, duration five seconds, recorded by clock; but this is only sensitive to more pronounced vibrations, so that the total duration was probably eight or nine seconds. A lesser shock was thought by some to have occurred about 3 a. m. same date.

Other reports of earthquakes were: Los Alamos, 2d; Hollister, 7th; Boulder Creek, 7th; Long Valley, 12th; Campbell, 7th; Point Loma, 2d, 9th, 13th, 15th, 19th, 22d, 25th, 27th, and 28th.

NOTES ON THE RIVERS OF THE SACRAMENTO AND SAN JOAQUIN WATERSHEDS DURING FEBRUARY, 1911.

By N. R. TAYLOR, Local Forecaster.

Sacramento watershed.—The Sacramento River above Monroeville averaged over 1 foot below the usual February stage, and in many of the upper reaches was the lowest on record for the season. This was especially so during the last decade.

From Colusa to the mouth of the river the Sacramento was above the average, generally with menacing stages during the first few days of the month.

The American, Feather, and Yuba Rivers were well up to the average, with some damaging freshets in many of the smaller forks.

San Joaquin watershed.—All streams in this watershed averaged above the February normal, especially the San Joaquin below the mouth of the Stanislaus, with a

stage at San Joaquin Bridge on the 1st of 22.5 feet, which is the highest ever before recorded in the history of the river. At the close of January heavy and damaging floods were in progress along the San Joaquin between Mendota and Stockton Channel, along Mormon Slough, and over a large area of country contiguous to the junction of the Cosumnes and Mokelumne Rivers, and it has been estimated that over 300,000 acres were inundated in the sections mentioned above between January 30 and February 4 and that damage aggregating \$300,000 resulted.

Warnings issued by the Weather Bureau were disseminated throughout all sections flooded well in advance of the floods and resulted in the estimated saving of over \$200,000 worth of property.

NOTE UPON THE WEATHER AT REDLANDS, CAL.

By Mr. WM. STOWE DEVOL.

A new temperature record was established for February, the mean for that month in 1911 being the lowest since the station was opened. The mean was 47.8°, or 5.8° below the normal for February, the next lowest monthly mean being 48.1°, in 1903.

In 1903 there was a much greater range of temperature and the low mean was due to a large number of cold nights. During the present month the temperature was more uniform and there were fewer cold nights. Only once during the month did the temperature fall as low as 32°. There was, however, not a single day when the mean temperature exceeded 54°.

The total precipitation for the month, 3.88 inches, was more than 50 per cent in excess of the normal, and, with one exception, was the greatest recorded in 13 years. Rain fell on 13 days and snow on two occasions. The fall of snow on the 15th continued for more than an hour, and remained on the ground thereafter about half an hour. On the 27th light snow fell, but melted immediately on reaching the ground.

There were many light but no killing frosts during the month. The mean relative humidity was not excessive. The dew point at the hour of reading the instruments in the afternoon averaged 23° lower than the observed temperature. The least difference between the observed temperature and the dew point was 2° and the greatest 51°.

WORK OF THE WEATHER BUREAU IN PROTECTING FRUIT; ESPECIALLY FROST PROTECTION.

By ALEXANDER G. MCADIE.

The following paper was read before the seventh annual meeting of the Western Fruit Jobbers' Association, held at Sacramento, Cal., February 15 to 18, 1911. (The paper was illustrated, and touched upon various lines of Weather Bureau work, but only that portion bearing upon frost protection is here given.)

California in 1910 produced more gold than any other State or Territory in the Union. California in the same year produced 75,000,000 barrels of crude oil, or nearly half the amount produced in the United States. But both items are of less interest to us who are gathered here than this other fact, that California produced in 1910 a fruit crop worth approximately \$50,000,000, of which deciduous fruits were worth about \$30,000,000 and citrus fruits about \$20,000,000; these values being based upon data in the annual number of the California Fruit Grower. Now, the gold and the oil output may or may not increase during the coming years, but the fruit crop is in large measure under human control, and there is every likelihood of a rapid increase in its value.